

ported barometer 28.98 (736.1), wind nw., force 9, high north-westerly sea. On the 14th, the disturbance, moving northeastward, was central near N. 54°, W. 23°. The s.s. "Scandinavian," in N. 54° 23', W. 20° 58', reported strong se. gale, lowest barometric reading 28.03 (711.9); at 1.33 p. m., heavy gale from s. by w., with high, dangerous sea, wind gradually hauling to westward, ship lying to with engines going slowly; at 5 h. 33 m. p. m., gale occasionally attaining hurricane force; 9.33 p. m., gale moderating, barometer rising, wind w. by s. The barometric gradient was apparently somewhat steep in the southern quadrants of the disturbance, as vessels south of the fifty-first parallel reported pressures of 29.00 (736.6) and above, and westerly and southwesterly gales of force 8 to 9. During the 14th, the storm-centre appears to have moved in a north-northeasterly course, and on the 15th, was off the north-west coast of Ireland. On the following day, the depression was central near the Hebrides, causing rainy weather and decreasing pressures over the Scandinavian peninsula.

VII.—This is a continuation of low area ix of chart i. On the 14th, the disturbance was central near Anticosti island; it passed over Newfoundland and, on the 15th, was apparently central near N. 50°, W. 48°. On that date, the s. s. "Brooklyn," in N. 45° 54', W. 46° 51', reported barometer 29.37 (746.0), wind w. by s., force 8, heavy westerly swell. On the 16th, the disturbance was probably near N. 55°, W. 25°. Captain Park, of the s. s. "Scandinavian," in N. 54° 18', W. 24° 16', reported: day began with moderate gale and unsettled weather, wind varying from se. to sw., and decreasing from force 8 to force 4; at 3 h. 40 m. a. m., weather clearing up, wind sw. by w., force 5, barometer 29.08 (738.6) and falling; at 1.48 p. m., the barometer read 28.89 (733.8), gale increasing rapidly; 5.48 p. m., barometer 28.93 (734.8), heavy wsw. gale of force 11, ship lying to with engines slowed; high dangerous sea; at 9.48 p. m. the gale began to moderate. On the 17th, the disturbance probably united with low area vi., then central to the north of the Hebrides.

VIII.—This is a continuation of the storm described as low area x. of chart i. On the 18th, the depression was central in the Canadian Maritime Provinces; during the day, it moved into the Atlantic, with decreasing pressure at the centre, and on the 19th, it was central as a severe storm near N. 50°, W. 43°. On that date, the s. s. "Frisia," in N. 48° 25', W. 36° 10', encountered a southwesterly gale, of force 6, with heavy sea, barometer reading 28.97 (735.8); s. s. "France," in N. 47° 52', W. 38° 15', reported barometer 29.07 (738.4), wind ssw., force 10, snow and hail. Vessels between 30° and 40° west longitude and between 45° and 50° north latitude, experienced southerly and southwesterly gales of force 10, while to the westward of the fortieth meridian, westerly and northwesterly gales prevailed. The disturbance moved in a north-easterly direction, and on the 20th, was central near N. 54°, W. 32°; the s. s. "Otranto," in N. 51° 46', W. 37° 06', reported barometer 28.60 (726.4), wind w. by s., force 4, shifting afterwards to w. by n., force 9; s. s. "Scandinavian," in N. 50° 03', W. 38° 25', barometer 28.73 (729.7), wind nw., force 10, high sea and showery weather. During the 21st and 22d, the disturbance moved northeastward, and on the 23d, it appeared near N. 56°, W. 15°, causing a decrease of pressure over the British Isles.

IX.—This disturbance was central near the mouth of the Saint Lawrence on the 21st; it moved over the Gulf, and on the following day, was central over the Atlantic, near N. 54°, W. 48°. The lowest barometric reading, 29.13 (739.9), was reported by the s. s. "Otranto," in N. 50° 01', W. 44° 09', wind sw. by s., force 10, cloudy weather and high cross-sea. During the 22d, the depression moved rapidly northeastward, and on the 23d, the region of least pressure was near N. 55°, W. 27°; the s. s. "Bolivia," in N. 54°, 00', W. 25° 16', reported barometer 29.12 (739.6), wind w. by n., force 10, heavy rain and very stormy weather, high and confused sea. During the 24th, the course apparently changed toward the southeast, and on the morning of the 25th, the region of least pressure was off

the southwestern coast of Ireland. This storm moved over the British Isles and the North Sea towards the Scandinavian peninsula, and was very violent during its passage, causing much damage on the coast of the British Isles.

X.—On the 26th, an area of low pressure appeared in mid-ocean, the s. s. "Lord Gough," in N. 50° 12', W. 32° 27', reporting barometer 29.42 (747.3), wind s. by w., force 9, weather threatening. The disturbance moved eastward, and probably on the 27th united with low area ix., then prevailing as a severe storm over the British Isles.

XI.—This depression appeared as a circular area of low pressure near N. 47°, W. 37°, on the last day of the month; its presence is indicated by the following vessel-reports: The s. s. "Landaff City," in N. 47° 54', W. 42° 20', reported: at 3h. 0m. a. m., Greenwich mean time, the wind, having been light and baffling, freshened from the east-southeastward, with heavy rain, and blew for three hours, with force 8; it then shifted to wsw., and at 12h. 0m. it suddenly shifted to ne., and blew with hurricane force for about two hours, after which it moderated to force 8, and hauled to n. During the height of the gale, a thick fog and heavy rain prevailed; barometer 29.40 (746.7). The s. s. "General Werder," in N. 46° 04', W. 42° 10', reported barometer 29.41 (747.0), wind sw. by w., force 9; and the s. s. "Britannic," in N. 49° 22', W. 38° 34', reported barometer 29.45 (748.0), wind ne., force 8, weather threatening. The subsequent track of this storm will probably appear on the chart for February, 1883.

#### TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada, for the month of January, 1883, is exhibited on chart iii., by the dotted isothermal lines.

A comparison of the mean temperature of January, 1883, with the means of the corresponding month in previous years, shows the former to have been colder than the average in every section of the country, with the exception of the Florida peninsula and southern California, where the monthly means are 2°.4 and 0°.7 above the normal respectively. In the districts along the Atlantic and Gulf coasts from the Mississippi river to New England, the departures have varied from 0°.8 in the east Gulf states to 2°.7 in the middle Atlantic and New England states. The month has been unusually cold in the central northern part of the country, the region of greatest cold lying between the upper Missouri valley and the upper lake region; there the mean temperature of the month has been more than 11° below the normal, and in the lower Missouri valley and upper lake region, the departures are 9° and 7°.9 respectively. In the other district east of the Rocky mountains, the mean temperatures have varied from 1°.5 below the normal in Tennessee, to 5°.2 below in the northern slope. West of the Rocky mountains, the monthly means are from 0°.4 below the normal in the southern plateau, to 4°.5 below the middle Pacific coast region, and 5°.4 below in the northern plateau. In southern California, there has been a slight increase over the January normal.

The following are some of the extreme monthly mean temperatures reported from Signal Service stations:

Stations reporting highest.		Stations reporting lowest.	
Key West, Florida	72.3	Saint Vincent, Minnesota	-13.4
Punta Rassa, Florida	66.2	Moorhead, Minnesota	-9.7
Cedar Keys, Florida	58.2	Fort Stevenson, Dakota	-5.4
Jacksonville, Florida	57.9	Fort Buford, Dakota	-4.5
Laredo, Texas	56.7	Bismarck, Dakota	-2.6
Brownsville, Texas	55.4	Pike's Peak, Colorado	-1.9
Savannah, Georgia	54.2	Mt. Washington, New Hampshire	0.8
Los Angeles, California	53.5	Saint Paul, Minnesota	1.1
San Diego, California	53.4	Huron, Dakota	2.9
Yuma, Arizona	51.7	Fort Assiniboine, Montana	4.9
Charleston, South Carolina	51.4	La Crosse, Wisconsin	4.9

In the first column of the following table is shown the mean temperature of January in previous years, for the several districts as determined from observations made at the Signal Service stations; the second column shows the mean of

January, 1883; and the third column shows the departures from the January normal.

Average Temperatures for January, 1883.

Districts.	Average for January Signal Service observa- tions.		Comparison of Jan., 1883, with the average for several years.
	For several years.	For 1883.	
New England.....	27.1	24.4	2.7 below.
Middle Atlantic states.....	34.1	31.4	2.7 below.
South Atlantic states.....	47.9	47.0	0.9 below.
Florida peninsula.....	61.3	63.7	2.4 above.
Eastern Gulf.....	50.4	49.6	0.8 below.
Western Gulf.....	48.6	45.0	3.6 below.
Rio Grande valley.....	53.7	51.4	2.3 below.
Tennessee.....	40.9	39.4	1.5 below.
Ohio valley.....	33.3	29.0	3.7 below.
Lower lakes.....	25.3	20.5	4.8 below.
Upper lakes.....	20.4	12.5	7.9 below.
Extreme northwest.....	5.9	— 5.6	11.5 below.
Upper Mississippi valley.....	23.2	11.9	11.3 below.
Missouri valley.....	20.0	11.0	9.0 below.
Northern slope.....	19.1	13.9	5.2 below.
Southern slope.....	43.6	39.3	4.3 below.
Northern plateau.....	25.6	20.2	5.4 below.
Middle plateau.....	28.7	26.5	2.2 below.
Southern plateau.....	40.0	39.6	0.4 below.
North Pacific.....	39.4	37.0	2.4 below.
Middle Pacific.....	47.7	43.2	4.5 below.
South Pacific.....	49.2	49.9	0.7 above.
Mount Washington, N. H.....	5.8	0.8	5.0 below.
Pike's Peak, Colo.....	3.2	— 1.9	5.1 below.
Fort Elliott, Tex.....	33.3	28.0	5.3 below.

#### DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the above table of comparative temperatures.

The Chief Signal Officer is indebted to voluntary observers for the following interesting items bearing upon this subject. These comparisons are of special importance, as many of the records from which they are made cover long periods of time, some extending back many years before the establishment of the Signal Service:

*California.*—The following table, showing the monthly and annual mean temperatures, and the averages by seasons at Sacramento, California, since March, 1853, has been compiled by Sergeant James A. Barwick, Signal Corps, U. S. A. The data used in their preparation from March, 1853, to December, 1874, are from a record kept by Dr. F. M. Logan, and were furnished by Mr. E. F. Smith, Secretary of the State Agricultural Society. The data used from January, 1875, to July, 1877, were obtained from Dr. F. W. Hatch, Secretary of the State Board of Health, and from Mr. S. H. Gerrish, a local observer of Sacramento; and from July, 1877, to December, 1882, the records of the Signal Service have been used. It will be seen that the lowest annual mean temperature was 57° in 1880; the highest was 62° in 1864, and the annual mean of twenty-nine years, 62° 2. The mean temperature of the month of January, 1883, (Signal Service) is 41° 9, or 5° 2 below the January mean of the twenty-nine preceding years.

Table of Mean Temperatures at Sacramento, California.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual means.	Means of spring.	Means of summer.	Means of autumn.	Means of winter.
1853.....	0	0	59.8	61.0	68.0	77.0	75.0	71.0	76.0	78.0	53.0	0	0	62.9	74.3	69.0	* 0
1854.....	43.0	51.0	53.6	60.0	62.0	67.0	80.6	69.5	65.0	60.0	55.0	48.0	59.5	58.3	72.4	60.0	47.3
1855.....	43.7	52.5	54.8	58.1	60.2	71.1	72.5	73.0	68.0	63.0	50.6	47.9	59.5	57.7	72.2	60.5	48.0
1856.....	48.0	52.6	57.0	58.8	63.9	71.1	75.1	69.6	70.9	58.0	52.2	46.0	60.1	59.9	71.9	60.4	48.9
1857.....	48.5	50.2	56.4	63.3	65.5	71.9	71.4	71.3	67.9	61.5	53.2	43.9	60.7	61.7	71.5	60.9	47.5
1858.....	45.0	52.2	53.7	59.8	65.2	69.4	70.8	70.6	68.9	59.5	54.2	47.7	59.5	59.6	70.3	60.9	48.2
1859.....	44.9	50.5	51.5	57.1	63.0	74.8	69.1	67.2	65.9	63.3	54.0	44.5	58.7	57.2	70.4	61.1	46.6
1860.....	46.2	49.8	53.3	57.8	58.5	65.5	73.2	73.5	67.6	59.8	53.5	43.5	59.0	56.5	70.8	60.3	46.5
1861.....	47.1	52.2	55.0	60.6	63.7	66.2	73.6	69.7	67.8	59.9	53.6	49.3	60.1	59.8	69.8	60.4	49.5
1862.....	46.4	47.5	53.6	56.0	61.2	69.3	73.2	75.0	70.4	67.6	53.1	50.9	60.2	57.6	72.8	63.7	48.3
1863.....	46.9	48.0	57.6	59.5	67.1	69.1	75.6	70.7	69.0	62.8	52.7	46.4	60.3	61.4	71.8	61.5	47.1
1864.....	49.2	53.6	56.1	62.1	68.5	71.1	74.8	74.7	69.8	64.5	53.5	46.5	62.8	62.2	73.5	62.6	49.7
1865.....	47.4	49.0	53.6	59.3	70.2	73.5	74.0	71.7	68.8	63.1	50.9	50.2	61.0	61.0	73.1	62.9	48.9
1866.....	46.5	53.5	54.2	61.9	63.1	72.2	70.2	70.0	72.2	65.2	53.8	44.1	62.1	59.7	74.8	63.7	48.0
1867.....	48.2	47.6	50.7	59.7	64.4	70.3	73.2	71.7	68.8	62.7	54.8	50.2	59.9	58.3	71.9	62.1	48.7
1868.....	47.0	50.5	55.0	60.1	64.2	69.5	73.8	71.2	68.3	62.0	53.0	46.8	60.1	59.8	71.5	61.4	48.1
1869.....	47.6	49.9	53.6	59.0	64.2	70.8	74.4	71.3	69.9	63.1	54.0	47.0	61.4	58.9	72.5	62.3	48.2
1870.....	48.6	51.1	53.0	57.0	61.0	69.3	71.8	72.6	68.0	63.6	53.4	45.5	59.6	57.0	71.2	61.7	48.7
1871.....	48.3	49.4	56.0	59.2	61.5	70.1	72.0	72.0	67.4	62.2	50.2	45.5	59.6	58.9	70.8	59.9	47.7
1872.....	48.5	53.3	56.8	57.6	67.0	69.2	71.4	73.1	68.8	58.9	51.2	43.7	60.4	60.5	71.6	59.6	50.2
1873.....	52.7	48.2	56.8	60.0	67.9	71.7	73.2	66.3	69.9	61.4	57.5	49.0	60.7	61.6	70.4	62.9	50.0
1874.....	45.7	49.3	52.9	59.5	64.7	70.2	72.8	70.9	70.7	61.7	63.5	47.7	59.8	59.0	71.3	62.2	47.6
1875.....	46.9	52.7	53.7	63.0	68.1	70.6	73.3	72.5	55.7	69.9	56.7	45.0	62.5	61.6	72.1	60.8	48.2
1876.....	48.8	50.2	54.0	59.5	65.7	76.9	74.0	72.8	70.1	63.5	53.3	48.0	61.7	59.9	74.6	62.3	49.0
1877.....	49.1	55.0	59.0	60.2	64.5	72.5	75.0	72.9	72.5	62.9	54.7	45.5	61.2	61.2	73.5	63.4	49.9
1878.....	49.7	51.3	56.7	59.4	65.5	71.8	73.4	73.4	69.0	62.9	55.5	48.6	61.3	60.2	72.9	62.5	49.9
1879.....	45.5	55.0	57.4	60.3	60.2	72.1	71.8	74.7	70.5	61.5	56.9	47.2	60.3	59.3	72.9	61.0	49.2
1880.....	43.5	40.0	48.8	54.6	61.6	66.6	70.9	69.7	68.0	62.1	49.7	44.0	57.5	55.0	69.1	59.9	44.5
1881.....	49.2	53.5	55.5	60.8	64.5	66.1	71.1	68.2	67.8	56.8	50.8	50.3	59.2	60.4	68.5	58.5	51.0
1882.....	45.1	46.3	53.0	55.8	64.0	68.1	73.4	71.9	68.4	58.4	49.5	46.2	† 59.4	57.6	71.1	58.8	45.9
Sums.....	1354.8	1472.1	1643.1	1783.0	1929.1	2115.1	2198.7	2148.7	2062.0	1879.3	1608.9	1364.8	1747.1	1784.7	2155.2	1847.2	1401.3
Means.....	47.1	50.8	54.8	59.4	64.3	70.5	73.3	71.6	68.7	62.7	53.6	47.1	† 60.2	59.5	78.1	61.6	† 48.3

\* Means for the winters from 1852-3 to 1881-2, both inclusive.

† Mean for 11 months.

‡ Mean for 29 years.

*Illinois.*—Anna, mean temperature 29° 34, or 4° 92 below the January average of the last eight years. During that period, the highest January mean, 49° 0, occurred in 1880; the lowest, 23° 9, occurred in 1875. Riley, mean temperature 8° 2, or 10° 4 below the January average of the last twenty years, and is the lowest monthly mean of that period, with the exception of January, 1875. Swanwick, mean temperature 24° 4, or 10° 6 below the January average. Peoria, mean temperature 15° 1 is the lowest January mean that has occurred during the last twenty-eight years, with the exception of January, 1857, when the mean was 13° 4. Rockford, mean temperature 9° 29 is the lowest mean, with the exception of January, 1875, (6° 55) that has occurred during the last ten years. The next lowest mean temperature was 11° 27, for January, 1881.

*Indiana.*—Logansport, the mean temperature, 20° 3, is 5° 7

below the January average of twenty-four years. The maximum temperature of January, 1883, is 43°, which is 2° lower than the lowest maximum, and 29° lower than the highest maximum for the period covered by the record; the minimum temperature of January, 1883, is —16°, or 14° degrees higher than the minimum for January, 1873, but is lower than the January minimum of sixteen of the twenty-four years. The greatest range of temperature during January, 90°, occurred in 1864; the least, 47°, occurred in 1863; the range for the entire period during January, is 102°. Vevay, mean temperature, 30° 99, is the January normal of eight years. The maximum temperature, 50°, is 10° below the average maximum of eight years, and the minimum temperature, 1°, is 4° 5 below the average minimum of the same period.

*Iowa.*—Clinton, mean temperature, 8° 0, or 9° 7 below the

January average, and is the lowest monthly mean temperature of which there is any record during the last twenty years. The minimum temperature of the month,  $-32^{\circ}$ , is the lowest recorded during that period.

**Kansas.**—Lawrence, mean temperature,  $19^{\circ}.65$ , or  $7^{\circ}.84$  below the January average of the last sixteen years. During that period the highest January mean,  $41^{\circ}.23$ , occurred in 1880; the lowest,  $15^{\circ}.6$ , occurred in 1875. The mean temperature of January, 1883, at 7.00 a. m., was  $13^{\circ}.5$ ; at 2 p. m.,  $26^{\circ}.2$ ; at 9.00 p. m.,  $19^{\circ}.5$ . Yates Centre, mean temperature,  $19^{\circ}.3$ , or  $8^{\circ}.3$  below the average of last three years. Wellington, mean temperature  $23^{\circ}.9$ , or  $5^{\circ}.7$  below the January average of the last four years.

**Maine.**—Gardiner, mean temperature,  $12^{\circ}.76$ , or  $5^{\circ}.0$  below the January average of the last forty-seven years. During

that period, the highest January mean,  $25^{\circ}.8$ , occurred in 1863; the lowest,  $7^{\circ}.1$ , occurred in 1844.

**Maryland.**—Sandy Springs, mean temperature,  $27^{\circ}.4$ , or  $4^{\circ}.0$  below the January average of the last sixteen years. Fallston, mean temperature,  $26^{\circ}.21$ , or  $4^{\circ}.13$  below the January average of the last thirteen years. The highest January mean of that period,  $40^{\circ}.13$ , occurred in 1880; the lowest,  $25^{\circ}.05$ , occurred in 1881.

**Michigan.**—Thornville, mean temperature,  $16^{\circ}.65$ , or about  $7^{\circ}$  below the January average of many years.

**Missouri.**—Saint Louis, the Missouri Weather Service reports the mean temperature to be  $23^{\circ}.1$ , or  $8^{\circ}.6$  below the January normal. The record covers a period of forty-six years, during which time, lower January mean temperatures occurred in but three years; viz.:  $20^{\circ}.1$  in 1856;  $19^{\circ}.3$  in 1857;  $21^{\circ}.3$  in 1875.

Table of Comparative Minimum Temperatures for the Month of January.

State or Territory.	Minimum for January, 1883, Signal Service.		Lowest since Signal Service stations were opened—3 to 12 years.			Lowest from any other source.			
	Station.	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
Alabama	Montgomery	0	Montgomery	0		Huntsville	0		
Arizona	Prescott	25	Prescott	14	73-'79	Fort Canby (old)	-9	1832, '36	9 years
Arkansas	Fort Smith	-8	Prescott	-17	1880	Mount Ida	-20	1856	12 "
California	Red Bluff	2	Little Rock	-15	1881	Fort Crook	-10	1878	6 "
Colorado	Pike's Peak	19	Campo	0	1880	Fort Garland	-20	1859	11 "
Do	Pike's Peak	-37	Pike's Peak	-33	1879	Fort Lyon	-40	1873	30 "
Connecticut	New London	2	New Haven	-14	1873	Colebrook	-28	1875	22 "
Do	New London	2	New London	-14	1873	Fort Randall	-25	1881	9 "
Dakota	Fort Buford	-45	Pembina	-53	1877	Fort Delaware	-44	1875	22 "
Delaware	Delaware Breakwater	14	Delaware Breakwater	10	1882	Dover	-5	1866	44 "
Do	Washington	11	Washington	-14	1881	Washington	0	1875	6 "
Dist. of Columbia	Jacksonville	29	Saint Marks	18	1879	Washington	-14	1835	48 "
Florida	Atlanta	14	Atlanta	9	1879	Fort Barrancas	10	1852	61 "
Georgia	Eagle Rock	-38	Eagle Rock	-30	1882	Atlanta	3	1873	4 "
Idaho	Chicago	-17	Chicago	-18	1879	Angusta Arsenal	8	1835	48 "
Illinois	Indianapolis	-11	Indianapolis	-22	1879	Fort Lapwai	-32	1875	19 "
Indiana	Fort Supply	-12	Fort Supply	-17	1881	Rock Island Arsenal	-29	1873	14 "
Do	Fort Supply	-12	Fort Supply	-17	1881	Galesburg	-29	1864	8 "
Indian Territory	Dubuque	-26	Dubuque	-24.5	1881	Arlington, near	-25	1879	2 "
Iowa	Leavenworth	-10	Leavenworth	-29	1873	Spiceland	-23	1879	13 "
Kansas	Louisville	8	Louisville	-10	74-'79	Fort Gibson	-20	1857	54 "
Kentucky	Shreveport	12	Shreveport	6	1879	Fort Sill	-20	1873	9 "
Louisiana	Eastport	-12	Eastport	-20	1874	Fort Madison, near	-33	1864	18 "
Do	Eastport	-12	Eastport	-20	1874	Fort Leavenworth	-30	1834	52 "
Maine	Ocean City	10	Baltimore	-6	1881	Newport Barracks	-15	1852	29 "
Do	Boston	0	Springfield	-14	1881	Baton Rouge	8	1852	22 "
Maryland	Alpena	-22	Escanaba	-28	1873	Okaloosa	5	1879	3 "
Massachusetts	Escanaba	-22	Saint Vincent	-44	1881	Brunswick	-52	1859	52 "
Michigan	Saint Vincent	-44	Breckenridge	-39	1873	Gardiner	-32	1878	41 "
Minnesota	Starkville	17	Vicksburg	10	1875	Fort McHenry	-15	1873	53 "
Mississippi	Springfield	-5	Saint Louis	-16	1875	Williamstown	-30	1835	55 "
Do	Springfield	-5	Saint Louis	-16	1875	Fort Brady	-42	1873	60 "
Missouri	New Chicago	-47	Fort Benton	-55	1875	Uniontown	-34	1861	11 "
Do	New Chicago	-47	Virginia City	-44	1875	Fort Ripley	-44	1860	17 "
Montana	North Platte	-25	North Platte	-27	1881	Fayette	7	1879	9 "
Nebraska	Pioche	-17	Winnemucca	-14	1879	Columbus	10	1864	9 "
Do	Pioche	-17	Winnemucca	-14	1879	Ashley	-27	1879	4 "
New Hampshire	Mount Washington	-29	Mount Washington	-46	1875	Saint Louis	-19	1855	40 "
Do	Mount Washington	-29	Mount Washington	-46	1875	Fort Benton	-58	1875	13 "
New Jersey	Sandy Hook	4	Barnegat	-10	1875	Fort Ellis	-53	1872	15 "
Do	Sandy Hook	4	Barnegat	-10	1875	Camp Sheridan	-30	1881	5 "
New Mexico	Santa Fe	-13	Santa Fe	-9	1881	Fort Niobrara	-35	1881	1 "
New York	Buffalo	0	Albany	-18	1878	Fort Ruby	-23	1864	5 "
Do	Rochester	0	Albany	-18	1878	Fort Halleck	-22	1868	13 "
North Carolina	Charlotte	15	Charlotte	11	79-'81	Dartmouth College	-34	1848	17 "
Do	Charlotte	15	Kittyhawk	11	1879	Stratford	-33	1861	10 "
Ohio	Sandusky	-11	Columbus	-20	1879	Paterson	-13	1866	10 "
Do	Sandusky	-11	Columbus	-20	1879	Ateo	-24	1881	7 "
Oregon	Umatilla	-8	Umatilla	-25	1879	Burnt Mills	-24	1875	3 "
Pennsylvania	Erie	-7	Pittsburg	-12	1875	Fort Union	-25	1881	31 "
Do	Erie	-7	Pittsburg	-12	1875	Salem	-40	1840	8 "
Rhode Island	Point Judith	1	Newport	-8	1882	Gouverneur	-38	1835	40 "
Do	Point Judith	1	Newport	-8	1882	Murphy	-16	1877	8 "
South Carolina	Charleston	25	Charleston	19	1873	Westerville	-16	1877	7 "
Do	Charleston	25	Charleston	19	1873	Lenoir	-24	1877	8 "
Tennessee	Knoxville	1.5	Knoxville	-14	1877	Jacksonburg	-25	1879	8 "
Do	Knoxville	1.5	Knoxville	-14	1877	Marietta	-22	1852	53 "
Texas	Fort Elliott	-12	Fort Elliott	0	1881	Fort Dallas	-23	1862	16 "
Utah	Salt Lake City	20	Salt Lake City	6	74-'82	Carlisle Barracks	-28	1873	37 "
Vermont	Burlington	-25	Burlington	-25	1882	Philadelphia	-9	1866	111 "
Do	Burlington	-25	Burlington	-25	1882	Providence	-17	1866	35 "
Virginia	Lynchburg	8	Fort Myer	-8	1881	Fort Adams	-13	1873	41 "
Washington	Spokane Falls	-28	Colfax	-8	1882	Fort Moultrie	14	1835	38 "
West Virginia	Morgantown	4	Morgantown	-6	1875	Spartanburg	0	1877	3 "
Wisconsin	La Crosse	-30	La Crosse	-43	1873	Charleston	16	1852	105 "
Wyoming	Cheyenne	-31	Cheyenne	-38	1875	Clarksville	-10	1879	8 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Glenwood Cottage	-8	1864	10 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Fort Davis	-15	1873	28 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Coalville	-30	1875, 77	8 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Woodstock	-38	1878	8 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Lunenburg	-29	1882	16 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Mount Solon	-18	1881	7 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Fort Colville	-33	1875	20 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Helvetia	-14	1879	7 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Embarras	-40	1875	19 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Fort Laramie	-40	1864	29 "
Do	Cheyenne	-31	Cheyenne	-38	1875	Fort Sanders	-61	1875	13 "

**New Hampshire.**—Grafton, mean temperature,  $12^{\circ}.3$ , or  $4^{\circ}.7$  below the January average of five years. Contoocookville, mean temperature,  $18^{\circ}.1$ , or  $3^{\circ}.6$  below the January average of the last twelve years.

**New York.**—Palermo, mean temperature,  $14^{\circ}.9$ , or  $6^{\circ}.7$  below the January average of the last thirty years. The highest January mean of that period,  $29^{\circ}.4$ , occurred in 1880; the lowest,  $12^{\circ}.8$ , occurred in 1881. North Volney, mean temperature,  $16^{\circ}.92$ , or  $5^{\circ}.37$  below the January average of the last fifteen years. The highest January mean of that period,  $31^{\circ}.8$ , occurred in 1880; the lowest,  $15^{\circ}.1$ , occurred in 1881.

**Pennsylvania.**—Dyberry, mean temperature,  $17^{\circ}.4$ , or  $3^{\circ}.9$  below the January average of the last nineteen years. The highest monthly mean of that period,  $30^{\circ}.7$ , occurred in 1880; the lowest,  $15^{\circ}.4$ , occurred in 1875. The minimum temperature of January, 1883,  $-20^{\circ}$ , occurred on the 24th; the lowest January minimum of a period of twenty-eight years is  $-32^{\circ}$ , and occurred January 30, 1873.

**Vermont.**—Woodstock, mean temperature,  $10^{\circ}.82$ , or  $5^{\circ}.08$  below the January average of the last sixteen years. The highest January mean of that period was  $23^{\circ}.77$ , in 1880; the lowest,  $5^{\circ}.82$ , in 1878. The highest January maximum temperature,  $62^{\circ}$ , occurred in 1876, and the lowest minimum,  $-38^{\circ}$ , occurred in 1873 and 1878.

**Virginia.**—Wytheville, mean temperature,  $33^{\circ}.8$ , or  $1^{\circ}.7$  above the January average. Variety Mills, mean temperature,  $32^{\circ}.0$ , or  $4^{\circ}.1$  below the January average of six years. The highest January mean of that period,  $44^{\circ}.9$ , occurred in 1880; the lowest,  $31^{\circ}.0$ , occurred in 1881.

**West Virginia.**—Helvetia, mean temperature,  $33^{\circ}.7$ , or  $0^{\circ}.9$  above the average of the last seven years.

#### RANGES OF TEMPERATURE AT SIGNAL SERVICE STATIONS.

Over the entire country the monthly ranges of temperature, during January, 1883, have varied from  $24^{\circ}$  to  $94^{\circ}$ . The greatest monthly ranges are reported from the northern slope and the extreme northwest, while the least are reported from California and from stations on the south Atlantic and eastern Gulf coasts. The smallest monthly ranges are as follows: San Francisco, California,  $24^{\circ}$ ; Key West, Florida,  $27^{\circ}$ ; Hatteras, North Carolina,  $34^{\circ}$ ; Delaware Breakwater, Delaware,  $36^{\circ}$ ; Chincoteague, Virginia,  $37^{\circ}$ ; Ocean City, Maryland,  $38^{\circ}$ ; Punta Rasa, Florida,  $38^{\circ}$ ; Baltimore, Maryland,  $39^{\circ}$ ; Cape May, New Jersey,  $39^{\circ}$ ; Fort Macon, North Carolina,  $39^{\circ}$ ; Little Egg Harbor, New Jersey,  $39^{\circ}$ ; Pensacola, Florida,  $39^{\circ}$ ; Philadelphia, Pennsylvania,  $39^{\circ}$ ; Port Eads, Louisiana,  $39^{\circ}$ ; Cedar Keys, Florida,  $40^{\circ}$ ; Sacramento, California,  $40^{\circ}$ . The largest are: Deer Lodge, Montana,  $94^{\circ}$ ; New Chicago, Montana,  $94^{\circ}$ ; Fort Buford, Dakota,  $91^{\circ}$ ; Cartersville, Montana,  $90^{\circ}$ ; Fort Meade, Dakota,  $90^{\circ}$ ; Fort Bennett, Dakota,  $89^{\circ}$ ; Fort Sully, Dakota,  $87^{\circ}$ ; Cheyenne, Wyoming,  $86^{\circ}$ ; Fort Benton, Montana,  $85^{\circ}$ ; Fort Assiniboine, Montana,  $84^{\circ}$ ; Helena, Montana,  $84^{\circ}$ ; West Las Animas, Colorado,  $83^{\circ}$ ; Fort Shaw, Montana,  $82^{\circ}$ ; Fort Keogh, Montana,  $81^{\circ}$ ; Terry's Landing, Montana,  $81^{\circ}$ ; Graham, Texas,  $79^{\circ}$ ; Moorhead, Minnesota,  $79^{\circ}$ ; Coleman City, Texas,  $78^{\circ}$ ; Fort Elliott, Texas,  $78^{\circ}$ ; Fort Supply, Indian Territory,  $78^{\circ}$ ; Bismarck, Dakota,  $77^{\circ}$ ; Fort Custer, Montana,  $77^{\circ}$ ; Cœur d'Alene, Idaho,  $76^{\circ}$ ; Dayton, Washington Territory,  $76^{\circ}$ ; North Platte, Nebraska,  $76^{\circ}$ ; Pomeroy, Washington Territory,  $76^{\circ}$ ; Eagle Rock, Idaho,  $75^{\circ}$ ; Huron, Dakota,  $75^{\circ}$ ; Spokane Falls, Washington Territory,  $75^{\circ}$ ; Billings, Montana,  $74^{\circ}$ ; Fort Lapwai, Idaho,  $74^{\circ}$ ; Fort Maginnis, Montana,  $74^{\circ}$ ; Phoenix, Arizona,  $74^{\circ}$ ; Fort Sill, Indian Territory,  $74^{\circ}$ ; Fort Stockton, Texas,  $74^{\circ}$ ; Prescott, Arizona,  $73^{\circ}$ ; Concho, Texas,  $72^{\circ}$ ; Pioche, Nevada,  $72^{\circ}$ ; Henrietta, Texas,  $71^{\circ}$ ; Fort McKavett, Texas,  $70^{\circ}$ ; Davenport, Iowa,  $69^{\circ}$ ; Fort Apache, Arizona,  $69^{\circ}$ ; Colfax, Washington Territory,  $68^{\circ}$ ; Omaha, Nebraska,  $68^{\circ}$ ; Palestine, Texas,  $68^{\circ}$ ; Fort Verde, Arizona,  $68^{\circ}$ ; Denison, Texas,  $67^{\circ}$ ; Salt Lake City, Utah,  $67^{\circ}$ ; Almoda, Washington Territory,  $66^{\circ}$ ; Fort Smith, Arkansas,  $66^{\circ}$ ; Saint Vincent, Minnesota,  $66^{\circ}$ ; Yankton, Dakota,  $66^{\circ}$ ; Des Moines, Iowa,  $65^{\circ}$ ; El Paso, Texas,  $65^{\circ}$ ; Fredericksburg, Texas,  $65^{\circ}$ ; Lewiston, Idaho,  $65^{\circ}$ ; Uvalde, Texas,  $65^{\circ}$ .

Table of Maximum and Minimum Temperatures for January, 1883.

State or Territory.	Signal Service.			U. S. Army Post Surgeons, or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
Alabama.....	Montgomery.....	77	25	Mount Vernon Barracks.....	76	24
Do.....	Do.....	77	25	Auburn.....	73	19
Arizona.....	Phoenix.....	87	13	Mount Ida.....	65	5
Do.....	Prescott.....	64	2	Ravenna.....	90	18
Arkansas.....	Fort Smith.....	68	2	Fort Bidwell.....	54	18
Do.....	Little Rock.....	66	12	Fort Collins.....	67	31
California.....	Los Angeles.....	82	30	Colorado Springs.....	50	32
Do.....	Red Bluff.....	65	19	Southington.....	45	7
Colorado.....	West Las Animas.....	62	22	Fort Stevenson.....	38	47
Do.....	Pike's Peak.....	21	37	Distributing Reservoir.....	51	9
Connecticut.....	New Haven.....	47	13	Rock Creek Bridge.....	51	9
Do.....	New London.....	45	2	Mayport.....	82	30
Dakota.....	Fort Meade.....	62	25	Fort Barrancas.....	76	15
Do.....	Fort Buford.....	45	16	Quitman.....	80	26
Delaware.....	Del. Breakwater.....	50	14	Forsyth.....	70	18
District of Columbia.....	Washington.....	56	11	Anna.....	52	3
Do.....	Do.....	56	11	Elmira.....	33	34
Florida.....	Key West.....	82	55	Laconia.....	37	0
Do.....	Jacksonville.....	76	29	Fort Wayne.....	45	18
Georgia.....	Savannah.....	74	27	Fort Reno.....	69	9
Do.....	Atlanta.....	64	14	Guttenburg.....	34	38
Idaho.....	Lewiston.....	51	14	Wellington.....	57	12
Do.....	Eagle Rock.....	37	38	Clay Centre.....	50	31
Illinois.....	Chicago.....	46	17	Bowling Green.....	62	2
Indiana.....	Indianapolis.....	45	11	Point Pleasant.....	70	17
Do.....	Do.....	45	11	Gardiner.....	38	17
Indian Territory.....	Fort Sill.....	72	2.5	Orono.....	41	25
Do.....	Fort Supply.....	66	12	Emmitsburg.....	50	4
Iowa.....	Davenport.....	46	23	Woodstock.....	43	2
Do.....	Dubuque.....	37	20	Williamstown.....	37	13
Do.....	Des Moines.....	39	26	Heath.....	40	0
Kansas.....	Leavenworth.....	59	10	Hastings.....	41	24
Do.....	Do.....	59	10	Minneapolis.....	22	31
Kentucky.....	Louisville.....	56	8	Fayette.....	72	22
Louisiana.....	New Orleans.....	77	34	Protem.....	64	1
Do.....	Shreveport.....	70	12	Corning.....	45	20
Maine.....	Eastport.....	44	12	Bedford.....	44	20
Do.....	Portland.....	44	1	Fort Assiniboine.....	42	43
Maryland.....	Baltimore.....	50	11	Fort Maginnis.....	50	34
Do.....	Ocean City.....	48	10	Lincoln.....	61	15
Massachusetts.....	Boston.....	50	6.5	Fort Niobrara.....	45	34
Do.....	Do.....	50	6.5	Humboldt.....	62	17
Michigan.....	Detroit.....	50	8	Carlin.....	48	46
Do.....	Escanaba.....	32	22	Bristol.....	48	22
Do.....	Alpena.....	38	22	Paterson.....	45	0
Minnesota.....	Saint Vincent.....	22	44	Fort Union.....	61	30
Do.....	Moorhead.....	37	42	Lordsburg.....	93	13
Mississippi.....	Starkville.....	71	17	White Plains.....	47	1
Missouri.....	Springfield.....	55	5	Friendship.....	40	20
Do.....	Do.....	55	5	Murphy.....	66	2
Montana.....	Helena.....	50	34	Highlands.....	57	6
Do.....	Cartersville.....	50	40	Portsmouth.....	65	8
Do.....	New Chicago.....	47	47	Westerville.....	51	10
Nebraska.....	North Platte.....	50	20	Marion.....	51	10
Do.....	Do.....	50	20	Fort Klamath.....	40	9
Nevada.....	Pioche.....	55	17	Dyberry.....	38	20
Do.....	Do.....	55	17	Germantown.....	40	4
New Hampshire.....	Mt. Washington.....	38	22	Fort Adams.....	42	1
New Jersey.....	Sandy Hook.....	48	9	Aiken.....	69	17
Do.....	Barren.....	46	0	Austin.....	64	8
Do.....	Silver City.....	67	8	Fort Concho.....	80	3
Do.....	Santa Fé.....	53	13	Terrace.....	50	20
New Mexico.....	Buffalo.....	48	0	Kelton.....	50	28
Do.....	Rochester.....	44	6	Nephi.....	47	37
New York.....	New River.....	69	36	Woodstock.....	44	31
Do.....	Charlotte.....	62	15	Variety Mills.....	57	5
North Carolina.....	Cincinnati.....	59	6	Helvetia.....	50	8
Do.....	Sandusky.....	49	11	Nellisville.....	26	41
Ohio.....	Do.....	49	11	Manitowoc.....	37	22
Do.....	Do.....	49	11	Fort Bridger.....	44	30
Oregon.....	Roseburg.....	54	12			
Do.....	Umatilla.....	52	8			
Pennsylvania.....	Pittsburg.....	54	1			
Do.....	Erie.....	48	7			
Rhode Island.....	Block Island.....	50	6			
Do.....	Poat Judith.....	44	1			
Do.....	Narragansett Pier.....	46	1			
South Carolina.....	Charleston.....	69	25			
Tennessee.....	Knoxville.....	70	1.5			
Texas.....	Fort Stockton.....	80	6			
Do.....	Laredo.....	80	23			
Do.....	Fort Elliott.....	66	12			
Do.....	Coleman City.....	77	1			
Utah.....	Salt Lake City.....	47	20			
Do.....	Do.....	47	20			
Vermont.....	Cape Henry.....	67	20			
Do.....	Lynchburg.....	58	8			
Do.....	Almoda.....	54	12			
Washington.....	Spokane Falls.....	47	28			
Do.....	Morgantown.....	58	4			
West Virginia.....	Mitwaukee.....	38	23			
Wisconsin.....	La Crosse.....	34	30			
Do.....	Cheyenne.....	55	31			
Wyoming.....	Do.....	55	31			

The greatest daily ranges of temperature have varied in the several districts as follows:—

**New England.**—From  $26^{\circ}$  at Provincetown, Massachusetts,

on the 13th, to 39° at New Haven, Connecticut, on the 13th, and 51° on the summit of Mount Washington, New Hampshire, on the 21st.

*Middle Atlantic states.*—From 20° at Baltimore, Maryland, on the 13th, to 34° at Cape Henry, Virginia, on the 21st.

*South Atlantic states.*—From 20° at Hatteras, North Carolina, on the 13th, and 28th, to 38° at Atlanta, Georgia, on the 21st.

*Florida peninsula.*—From 14° at Key West, on the 9th, to 24° at Punta Rassa, on the 22d.

*Eastern Gulf.*—From 23° at New Orleans, Louisiana, on the 21st, to 39° at Mobile, Alabama, on the 21st.

*Western Gulf.*—From 25° at Port Eads, Louisiana, on the 9th, and 26° at Galveston, Texas, on the 8th, to 43° at Fredericksburg, Texas, on the 22d.

*Rio Grande valley.*—From 35° at Brownsville, Texas, on the 19th, to 42° at Eagle Pass, Texas, on the 23d.

*Ohio valley and Tennessee.*—From 28° at Memphis, Tennessee, on the 26th, and 30° at Indianapolis, Indiana, on the 20th and 24th, to 37° at Knoxville, Tennessee, and 40° at Pittsburg, Pennsylvania, on the 21st.

*Lower lakes.*—From 26° at Detroit, Michigan, on the 13th, to 44° at Buffalo, New York, on the 21st.

*Upper lakes.*—From 24° at Mackinac City, Michigan, on the 26th, to 42° at Duluth, Minnesota, on the 19th.

*Extreme northwest.*—From 37° at Saint Vincent, Minnesota, on the 11th, to 50° at Fort Stevenson, Dakota, on the 8th.

*Upper Mississippi valley.*—From 34° at La Crosse, Wisconsin, and Springfield, Illinois, on the 19th, and Saint Louis, Missouri, on the 24th, to 59° at Des Moines, Iowa, on the 9th.

*Missouri valley.*—From 37° at Springfield, Missouri, on the 19th, to 47° at Omaha, Nebraska, and at Yankton, Dakota, on the 9th.

*Northern slope.*—From 36° at Cheyenne, Wyoming, on the 20th, to 49° at Forts Benton and Shaw, Montana, on the 5th and 22d respectively.

*Middle slope.*—From 31° on the summit of Pike's Peak Colorado, to 56° at West Las Animas, Colorado, on the 22d.

*Southern slope.*—From 43° at Fort Sill, Indian Territory, on the 20th, to 51° at Coleman City, Texas, on the 26th, and 52° at Fort Stockton, Texas, on the 25th.

*Southern plateau.*—From 31° at Santa Fé, New Mexico, on the 21st, and at Fort Grant, Arizona, on the 29th, to 47° at Fort Apache, Arizona, on the 21st.

*Middle plateau.*—From 24° at Salt Lake City, Utah, on the 20th, to 37° at Pioche, Nevada, on the 21st.

*Northern plateau.*—From 26° at Umatilla, Oregon, on the 5th, to 44° at Fort Missoula, Montana, on the 9th.

*North Pacific.*—From 18° at Portland, Oregon, on the 17th, to 24° at Olympia, Washington Territory, on the 18th.

*Middle Pacific.*—From 14° at San Francisco, California, on the 22d, to 35° at Red Bluff, California, on the 9th.

*South Pacific.*—From 32° at Visalia, California, on the 23d, to 37° at Los Angeles, California, on the 23d and at Yuma, Arizona, on the 30th.

#### LOW TEMPERATURES.

*California.*—San Francisco, 20th: Reports of intensely cold weather are received from points along the Central Pacific railroad; at Elko, Nevada, on the morning of the 19th, the temperature fell to -54°.

*Colorado.*—Denver, 19th: Minimum temperature -20°, and the mean for the day the lowest ever recorded here; the temperature did not rise above -9°. The following low temperatures were reported from points along the Denver and Rio Grande railroad on the morning of the 20th: Divide, -26°; Marshall Pass, -30°; Gunnison, -40°; Crested Butte, -38°; Leadville, -33°; Tennessee Pass, -35°; Red Cliff, -32°; Robinson, -40°; Frisco, -33°; Cumbres, -25°. The following additional reports were received at the Western Union telegraph office: Rosita, -25°; Central City, -31°; Colorado Springs, -29°; Boreas, -45°; Breckenridge, -40°; mercury froze; Alma, -28°; Boulder, -28°. Leadville, 20th: At 5

a. m. of this date, the temperature in this city stood at 39° below zero; and at Kokomo, eighteen miles north, it was 43° below zero.

*Illinois.*—Lincoln, 9th: at 7 a. m. of this date, the mercury stood at 14° below zero, and remained several degrees below all day. On the morning of the 22d, the temperature fell to -18°, being the coldest weather experienced here for years. Peoria, 22d: the temperature fell to -22° on this date. No lower temperature has been recorded at this place since the winter of 1855-6. In January, 1864, and 1873, and December, 1872, the temperature also fell to -22°. Quincy, 22d: early this morning the temperature was from 21° to 28° below zero in different exposed localities. At 8 a. m. the temperature was -8°; at noon, zero, and at 4 p. m., 10°. Shelbyville, 9th: the temperature ranged from 10° to 12° below zero during the morning. Ice men anticipate a good harvest. Warsaw, 22d: the weather of the last few days has been the coldest experienced here during the last forty years.

*Iowa.*—Cresco: the temperature remained below zero from the morning of the 19th to that of the 25th. On the morning of the 22d, the minimum temperature was -34°, which is the lowest that has been recorded here for many years. Dubuque, 9th: temperature from 20° to 22° below zero; coldest day with but one exception, known for many years. On the 22d, owing to the extremely low temperature, trains from the north were delayed five hours, it being impossible to keep up steam. Stock has suffered severely in this county; many cases of freezing have been reported. Nearly all out-door work has been suspended. Trains were also delayed by the extreme cold on 23d. Logan: extremely cold from the 19th to the 23d, the temperature ranging from 4° to -26°.

*Kansas.*—Leavenworth, 20th: temperature, -20°, lowest of season; all out-door work suspended. Topeka: from the 18th to the 24th, the temperature fell below zero on each day. Independence: the mean temperature of the 19th and 20th is the lowest ever recorded here. Wichita, 22d: the late weather has been the coldest known in this section for years. Stock men from the Cherokee lands and southern Kansas report the losses as comparatively small. While the weather was intensely cold, there was no sleet, otherwise the loss of stock would have been very great.

*Louisiana.*—Point Pleasant, 21st: the mean temperature of this date nearly corresponds to the mean of January 20, 1858, which is said to have been the coldest day of this century at this place.

*Maine.*—Bangor, 6th: the thermometer registered 36° below zero in the northern part of Penobscot county during the morning. Calais, 26th: temperature, -26° at 7 a. m.

*Michigan.*—Coldwater: at 5 p. m. of the 20th, the thermometer recorded 30°; at 10 p. m., 2°; at 1 a. m. of the 21st, -14°; at 6 a. m., -22°; at 10 a. m., -18°, and did not rise above -5° during the day. On the 22d, at 6 a. m., the temperature was -24°, and did not rise above -12° during the day. On the 23d, the lowest observed was -20°, and at 2 p. m. rose to zero. This is considered the coldest weather experienced here for more than twenty years.

*Nebraska.*—Omaha, 19th: minimum temperature -22°. The suffering from cold was intense; many persons had their ears, hands, and feet frozen.

*New Mexico.*—Regina, 20th: the worst storm ever experienced in this part of the country now prevails throughout the territory. The temperature stands at 58° below zero.

*Texas.*—Buffalo, 19th: temperature 16° and the ground covered with two inches of sleet. Corsicana, 19th: the weather is bitterly cold and snow fell throughout the day. This is the first snow that has fallen here for more than two years. Dallas, 22d: the cold weather continues, though it has moderated somewhat; all streams are frozen. The cold weather has been very disastrous to cattle and sheep and especially to lambs and calves, in the northwestern part of the state, where they are reported to be dying in large numbers. Fort Worth, 19th: a norther struck this city during the night and the temperature



fell to 12°. Giddings, 19th: the thermometer, at 4 a. m., stood at 15°. The heaviest freeze for many years is expected. Hillsboro, 19th: the weather is intensely cold and a fine mist of snow has been falling all day. Marshall 20th: last night and to-day were the coldest of the season, the temperature being 18° at sunrise. McKinney, 19th: extremely cold weather; mercury 10° above zero. San Saba, 19th: the thermometer recorded 12°, on this date, being the lowest for the winter. The weather is very severe on cattle and sheep.

**Utah.**—Salt Lake City, 20th: the temperature in this city reached 20° below zero this morning. Temperatures as low as 40° below zero are reported from neighboring places in Utah.

**Washington Territory.**—Bainbridge Island, 19th: coldest day of the past five years; minimum temperature 12°.

**Wisconsin.**—Embarrass: at 5 a. m. of the 21st, the mercury froze at -40° and remained frozen until 8.30 a. m.

#### FROSTS.

In the various districts they were reported on the following dates:—

**New England.**—1st to 31st.

**Middle Atlantic states.**—1st to 5th, 8th to 13th, 15th to 20th, 22d to 27th, 29th, 30th, 31st.

**South Atlantic states.**—1st, 2d, 3d, 5th, 9th to 17th, 22d to 25th, 27th, 28th, 30th.

**Eastern Gulf.**—1st, 2d, 9th to 12th, 14th, 15th, 21st to 34th, 29th, 30th.

**Western Gulf.**—1st, 2d, 4th, 6th to 12th, 14th, 18th to 25th, 28th to 31st.

**Rio Grande valley.**—7th to 11th, 14th, 20th to 23d, 29th, 30th, 31st.

**Ohio valley and Tennessee.**—1st to 16th, 18th to 31st.

**Lower lakes.**—1st to 31st.

**Upper lakes.**—1st to 31st.

**Extreme northwest.**—1st to 31st.

**Upper Mississippi valley.**—1st to 31st.

**Missouri valley.**—1st to 31st.

**Northern slope.**—1st to 10th, 12th to 31st.

**Middle slope.**—1st to 5th, 7th 8th, 10th, 11th, 14th, 15th, 17th, 18th, 21st, 24th, 25th, 26th, 28th, 29th, 31st.

**Southern slope.**—1st to 4th, 6th to 11th, 13th, 14th, 18th to 25th, 28th, 29th.

**Southern plateau.**—1st to 31st.

**Middle plateau.**—1st, 2d, 3d, 5th, 6th, 8th to 13th, 15th, 16th, 18th, 19th, 20th, 22d, 23d, 27th.

**California.**—2d to 24th, 26th, 27th, 28th.

The occurrence of frosts has also been reported by the following stations, not included in the districts named above: Cedar Keys, Florida, 12th, 24th; Umatilla, Oregon, 10th, 11th, 12th; Roseburg, Oregon, 1st, 2d, 4th, 7th to 11th, 18th to 23d; Olympia, Washington Territory, 1st, 2d, 12th, 13th, 17th; San Diego, California, 7th, 20th.

#### ICE.

The subject of the formation of ice in the northern sections, is considered elsewhere in the REVIEW under the heading "ice in rivers and harbors." The following are exceptional cases of ice formation in the southern sections of the country:—

**Alabama.**—Auburn, 11th.

**Arizona.**—Tucson, 9th; Yuma, 20th, 21st.

**California.**—Los Angeles, 20th; Visalia, 12th.

**Florida.**—Jacksonville, 10th, 12th, 13th, 14th; Pensacola, 10th, 23d; Saint Augustine, 10th, 12th.

**Georgia.**—Augusta, 12th; Quitman, 10th, 12th, 24th.

**Louisiana.**—New Orleans, 9th.

**Mississippi.**—Fayette, 22d, 23d.

**North Carolina.**—Fort Macon, 10th, 12th.

**South Carolina.**—Stateburg, 11th, 13th.

**Texas.**—Brownsville, first ice, 9th; Eagle Pass, 1st, 9th, 14th, 19th, 20th to 23d; Fort Concho, 1st, 8th, 13th; Fredericksburg, 20th; Galveston, 9th, 20th, 21st; Indianola, 2d, 9th, 20th; Palestine, 20th.

#### PRECIPITATION.

[Expressed in inches.]

The distribution of rainfall over the United States and Canada, as determined from observations taken at more than five hundred stations, is exhibited on chart iv. Owing to lack of reports from certain sections, the lines upon the chart indicating the amount of precipitation have not been completed; viz.: from northeastern New York eastward over northern Maine; in northern Wisconsin and northwestern Michigan; from southern Idaho and northern Nevada to central Oregon.

There has been an excess over the average January rainfall in all the districts bordering on the Atlantic and Gulf coasts, except in southern Texas. The excesses are very large in the south Atlantic and east Gulf states, being 4.00 and 5.31 respectively. In the other districts named, the departures vary from 0.29 in New England, to 0.73 in the west Gulf states. In Tennessee, the upper lake region, the extreme northwest, Missouri valley and northern plateau, the rainfall is also above the January average. In those districts the excesses are small, varying from 0.03 to 0.31, except in the northern plateau where the departure is 1.07. An area of deficiency embraces the lower lakes, the upper Mississippi and Ohio valleys, and the whole of the country lying west of the one-hundredth meridian, except in the extreme northwest and northern plateau. A marked deficiency occurs on the Pacific coast, especially in the middle Pacific, where it amounts to 4.14. In the other districts embraced in the area of deficiency, the departures vary from 0.03 in the northern slope, to 1.11 in the Rio Grande valley.

In the first column of the following table is given the average January precipitation in the various districts for several years; in the second column is given the average for January, 1883; and the third column shows the excess or deficiency of January, 1883, as compared with the average of previous years.

Average precipitation for January, 1883.

Districts.	Average for January. Signal Service observations.		Comparison of Jan., 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	Inches.	Inches.
New England.....	3.68	3.97	0.29 excess.
Middle Atlantic states.....	3.73	4.22	0.49 excess.
South Atlantic states.....	4.19	8.19	4.00 excess.
Florida peninsula.....	3.60	5.63	0.63 excess.
Eastern Gulf.....	4.98	10.29	5.31 excess.
Western Gulf.....	2.84	3.55	0.73 excess.
Rio Grande valley.....	1.52	0.41	1.11 deficiency.
Tennessee.....	6.32	6.45	0.13 excess.
Ohio valley.....	3.59	3.17	0.42 deficiency.
Lower lakes.....	2.52	1.84	0.68 deficiency.
Upper lakes.....	1.69	1.72	0.03 excess.
Extreme northwest.....	0.57	0.88	0.31 excess.
Upper Mississippi valley.....	1.59	1.31	0.28 deficiency.
Missouri valley.....	0.74	0.80	0.06 excess.
Northern slope.....	0.66	0.63	0.03 deficiency.
Southern slope.....	0.80	0.68	0.72 deficiency.
Northern plateau.....	1.25	2.32	1.07 excess.
Middle plateau.....	0.94	0.83	0.11 deficiency.
Southern plateau.....	0.81	0.76	0.05 deficiency.
North Pacific.....	8.19	7.46	0.73 deficiency.
Middle Pacific.....	5.81	1.67	4.14 deficiency.
South Pacific.....	2.31	0.93	1.38 deficiency.
Mt. Washington, N. H.....	4.29	4.16	0.13 deficiency.
Pike's Peak, Colo.....	1.89	0.54	1.35 deficiency.
Fort Elliott, Tex.....	0.27	trace.	0.27 deficiency.

#### DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal Service stations are shown in the above table of average precipitation. The Chief Signal Officer is indebted to voluntary observers for the following interesting items bearing upon this subject. These comparisons are of special importance, as many of the records from which they are made cover long periods, some extending back many years before the establishment of the Signal Service.

**Illinois.**—Anna: monthly precipitation, 2.25, or 1.73 below the January average of the last eight years. The largest monthly precipitation for January during that period, 13.25, was that of 1876; the smallest, 0.91, was that of 1875. **Riley:** monthly precipitation, 2.18, is 0.35 above the January average